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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,487	12/31/2003	Riad Ghabra	74516	1207
4859	7590	12/12/2005	EXAMINER	
MACMILLAN SOBANSKI & TODD, LLC ONE MARITIME PLAZA FOURTH FLOOR 720 WATER STREET TOLEDO, OH 43604-1619			TRAN, THUY V	
			ART UNIT	PAPER NUMBER
			2821	

DATE MAILED: 12/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/749,487	GHABRA ET AL.
Examiner	Art Unit	
	Thuy V. Tran	2821

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1)  Responsive to communication(s) filed on amendment submitted 09/23/2005.

2a)  This action is FINAL.                            2b)  This action is non-final.

3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## **Disposition of Claims**

4)  Claim(s) 1-20 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5)  Claim(s) 20 is/are allowed.

6)  Claim(s) 1-4, 7-11, 13-15, 19 is/are rejected.

7)  Claim(s) 5,6,12,16 and 19 is/are objected to.

8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

9)  The specification is objected to by the Examiner.

10)  The drawing(s) filed on 31 December 2003 is/are: a)  accepted or b)  objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All    b)  Some \* c)  None of:  
1.  Certified copies of the priority documents have been received.  
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

1)  Notice of References Cited (PTO-892)  
2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3)  Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_  
4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_  
5)  Notice of Informal Patent Application (PTO-152)  
6)  Other: \_\_\_\_\_

## DETAILED ACTION

This is a response to the Applicants' amendment submitted on 09/23/2005. In virtue of this amendment, claims 1-20 remain pending in the instant application.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

*(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.*

2. Claims 1-4, 10-11, 13-15, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fink et al. (U.S. Patent No. 6,903,687): Fig. 1A in view of Fig. 3A.

With respect to claim 1, Fig. 1A of Fink et al. shows a low profile antenna for use in a vehicle remote communication system comprising (1) an inherent printed circuit board [PCB] having a ground plane [3] mounted on a first side thereof, (2) a dielectric spacer [1] mounted to said first side of said printed circuit board, and (3) a lineal antenna trace [2] disposed on said dielectric spacer [1]. Fig. 1A of Fink et al. further shows a transmission line [4, 5] having first and second signal conductors [4 and 5, respectively], wherein said first conductor [4] is coupled to a feed point on said lineal antenna trace [2]. However, Fig. 1A of Fink et al. does not show that the second conductor [5] is coupled to both the ground plane and a second point on the lineal antenna trace spaced from said feed point.

Fig. 3A of Fink et al. shows a low profile antenna comprising a transmission line [31, 36] having second conductor [36] coupled to both ground plane [26] and a second point on a lineal antenna trace [28] spaced from a feed point (at the conductor [31]).

Depending on a desired application or environment of use, one of ordinary skills in the art at the time of the invention would find it obvious to modify the antenna system of Fig. 1A of Fink et al. by reconfiguring the transmission line connection in that the second conductor is coupled to both the ground plane and the second point on the lineal antenna trace spaced from the feed point as shown in Fig. 3A of Fink et al. to create a short circuit thereby and thus to facilitate a dominant mode of operation of the antenna (see col. 7, lines 27-32 and 48-50).

With respect to claim 2, Fig. 1A of Fink et al. shows that the dielectric spacer [1] is mounted to said ground plane [3].

With respect to claim 3, Fig. 1A of Fink et al. shows that the lineal antenna trace includes a middle region and first and second end regions.

With respect to claim 4, the combination of Figs. 1A and 3A of Fink et al. show that the feed point is located at one of said first and second end regions and said second point is located at said middle region.

With respect to claim 10, the combination of Figs. 1A and 3A of Fink et al. show all of the claimed subject matter, as expressly recited in claim 1, except that the lineal trace be formed in a serpentine configuration. However, it has been well known that such a serpentine configuration may conserve space of the antenna system (see Prior Art of Record to Johnson et al.; U.S. Patent No. 6,52,128 B1; col. 7, lines 12-14). Therefore, to form the antenna element of the combination of Figs. 1A and 3A of Fink et al. in a serpentine configuration to conserve space of the antenna system would have been deemed obvious to a person skilled in the art of antenna.

With respect to claim 11, Fig. 1A of Fink et al. shows that the lineal antenna trace [2] includes a substantially planar portion.

With respect to claim 13, Fig. 1A of Fink et al. shows a low profile antenna for use in a vehicle remote communication system using a predetermined RF signal comprising (1) an inherent printed circuit board [PCB] having a ground plane [3] mounted on a first side thereof, (2) an intermediate support member [1] mounted to said first side of said printed circuit board, and (3) a lineal antenna trace [2] mounted to said support member and spaced apart from said ground plane [3] by a predetermined distance. Fig. 1A of Fink et al. further shows a transmission line [4, 5] having first and second signal conductors [4 and 5, respectively], wherein said first conductor [4] is coupled to a feed point on said lineal antenna trace [2]. However, Fig. 1A of Fink et al. does not show that the second conductor [5] is coupled to both the ground plane and a second point on the lineal antenna trace spaced from said feed point.

Fig. 3A of Fink et al. shows a low profile antenna comprising a transmission line [31, 36] having second conductor [36] coupled to both ground plane [26] and a second point on a lineal antenna trace [28] spaced from a feed point (at the conductor [31]).

Depending on a desired application or environment of use, one of ordinary skills in the art at the time of the invention would find it obvious to modify the antenna system of Fig. 1A of Fink et al. by reconfiguring the transmission line connection in that the second conductor is coupled to both the ground plane and the second point on the lineal antenna trace spaced from the feed point as shown in Fig. 3A of Fink et al. to create a short circuit thereby and thus to facilitate a dominant mode of operation of the antenna (see col. 7, lines 27-32 and 48-50).

With respect to claim 14, the combination of Figs. 1A and 3A of Fink et al. show all of the claimed subject matter, as expressly recited in claim 13, except that the lineal trace be formed in a serpentine configuration. However, it has been well known that such a serpentine

configuration may conserve space of the antenna system (see Prior Art of Record to Johnson et al.; U.S. Patent No. 6,52,128 B1; col. 7, lines 12-14). Therefore, to form the antenna element of the combination of Figs. 1A and 3A of Fink et al. in a serpentine configuration to conserve space of the antenna system would have been deemed obvious to a person skilled in the art of antenna.

With respect to claim 15, Fig. 1A of Fink et al. shows that the lineal antenna trace [2] includes a substantially planar portion.

With respect to claim 17, Fig. 1A of Fink et al. shows that the lineal antenna trace includes a middle region and first and second end regions.

With respect to claim 18, the combination of Figs. 1A and 3A of Fink et al. show that the feed point is located at one of said first and second end regions and said second point is located at said middle region.

3. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fink et al.: Fig. 1A in view of Fig. 3A as applied to claim 1 above, and further in view of Weiss et al. (U.S. Patent No. 4,366,484).

With respect to claim 7, the combination of Figs. 1A and 3A of Fink et al. show all of the claimed subject matter, as expressly recited in claim 1, except that the dielectric spacer material is plastic foam.

Weiss et al. discloses the use of plastic foam as a dielectric material (see col. 3, line 33; col. 4, line 54; col. 5, line 24).

It would have been obvious to one of ordinary skills in the art at the time of the invention to implement the antenna of the combination of Figs. 1A and 3A of Fink et al. by employing plastic foam as a material for the dielectric spacer to maintain the correct resonant cavity

dimensions and thus to increase the nominal frequency with the temperature and/or substantially compensate the temperature of the antenna since such a use of the plastic foam for the stated purpose has been well known in the art as evidenced by the teachings of Weiss et al. (see Abstract, lines 5-7; col. 5, line 25).

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fink et al.: Fig. 1A in view of Fig. 3A as applied to claim 1 above, and further in view of Wang et al. (U.S. Patent No. 5,589,842).

With respect to claim 8, the combination of Figs. 1A and 3A of Fink et al. show all of the claimed subject matter, as expressly recited in claim 1, except that the lineal antenna trace is spaced apart from the ground plane by a distance of less than one quarter wavelength of the RF signal.

Wang et al. discloses, in Fig. 2A, an antenna element [21] spaced apart from a ground plane [GP] by a distance of  $d$  of less than one quarter of an RF signal (see col. 14, line 24).

It would have been obvious to one of ordinary skills in the art at the time of the invention to implement the antenna system of the combination of Figs. 1A and 3A of Fink et al. by arranging the lineal antenna trace apart from the ground plane at a distance of less than one quarter wavelength so as to be able to obtain a near maximum gain at a given frequency since such a selected distance of the antenna element with respect to the ground plane for the stated purpose has been well known in the art as evidenced by the teachings of Wang et al. (see col. 14, line 24).

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fink et al.: Fig. 1A in view of Fig. 3A as applied to claim 1 above, and further in view of Deming et al. (U.S. Patent No. 6,246,368).

With respect to claim 9, the combination of Figs. 1A and 3A of Fink et al. show all of the claimed subject matter, as expressly recited in claim 1, except that the feed point and the second point of the lineal antenna be spaced apart by a predetermined distance.

Deming et al. discloses, in Fig. 1, a feed point [P] spaced apart from a second point [28] by a distance of W.

It would have been obvious to one of ordinary skills in the art at the time of the invention to implement the antenna system of the combination of Figs. 1A and 3A of Fink et al. by arranging the feed point apart from the second point at a predetermined distance to improve the operational capability of the antenna system since Deming teaches such a distance selection would result in increasing the antenna's gain (see col. 8, lines 28-30).

#### *Allowable Subject Matter*

6. Claim 20 is allowed.

7. Claims 5-6, 12, 16, and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter:

Prior art fails to disclose or fairly suggest:

- A low profile antenna for use in a vehicle remote communication system wherein said antenna is an active antenna further comprising a plurality of active components

mounted on a second side of said printed circuit board, and wherein said first conductor is coupled to at least one of said active components, in combination with the remaining claimed limitations as called for in claim 5 (claim 6 would be allowable since it is dependent on claim 5);

- A low profile antenna for use in a vehicle remote communication system wherein the printed circuit board is a multi-layer printed circuit board having a second layer disposed between said ground plane and said dielectric spacer, in combination with the remaining claimed limitations as called for in claims 12 and 16;
- A low profile antenna for use in a vehicle remote communication system utilizing a predetermined RF signal, wherein said feed point and said second point of said lineal trace are spaced apart by a predetermined distance less than one quarter wavelength of said RF signal, in combination with the remaining claimed limitations as called for in claim 19; and
- A low profile antenna for use in a vehicle remote communication system utilizing a predetermined RF signal, wherein said feed point and said second point are spaced apart by a predetermined distance less than one quarter wavelength of said RF signal, in combination with the remaining claimed limitations as called for in independent claim 20.

*Citation of relevant prior art*

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Prior art Aisenbrey (U.S. Patent No. 6,947,005 B2) discloses low cost antennas.

Prior art Deguchi et al. (U.S. Patent No. 6,292,154 B1) discloses an antenna device.

Prior art Marko (U.S. Patent No. 4,849,765) discloses a load profile antenna.

***Remarks and conclusion***

10. Applicant's arguments, see pages 6-8 of the Amendment, filed 09/23/2005, with respect to the rejection(s) of claim(s) 1-4, 7-11, 13-15, and 17-19 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Fink et al. (see "Claim Rejections – 35 USC § 103" set forth above in this Office Action for details).

The cited prior art to Wang et al. is still considered valid with regard to the rejection of claim 8 since the teachings of Wang et al. refer to a specific distance between the antenna element and the ground plane that results in a maximum gain (see col. 14, line 24).

***Inquiry***

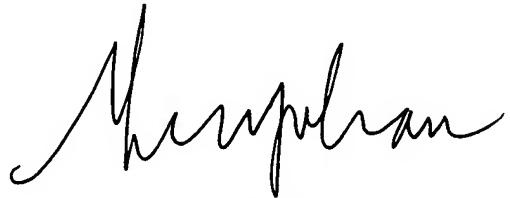
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thuy V. Tran whose telephone number is (571) 272-1828. The examiner can normally be reached on M-F (8:00 AM -5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

12/10/2005



THUY V. TRAN  
PRIMARY EXAMINER